

# RESEARCH AND TECHNOLOGY

# REVIEW

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## RESEARCH BULLETIN

### Research Advisory Committee (RAC) Meeting

On June 17, 1999, the NDOT annual RAC meeting was held to prioritize research proposals submitted for the FY 2000 R, D & T work program. A total of fifteen proposals, including eight pooled-fund projects, were evaluated based on the department's need, potential benefit, and urgency. Eight proposals were recommended to the department's Research Management Committee (RMC) for final approval. While the first-order of business for the RAC was the prioritization of proposed research, the committee was also presented information concerning progress made on goals for improvement set during last year's research program peer exchange. Also, the RAC was informed that a new

position (Research Coordinator) will be added to the Research Division as of October 1, 1999. ☼

### NDOT Research Report: Characterization of Nevada's Binders Using Superpave Technology

In an effort to implement the Superpave technology in Nevada, the Nevada Department of Transportation (NDOT) sponsored a research project to appraise the applicability of the Superpave binder-grading system under Nevada's conditions. This report presents the results of the six-year study (from 1992 to 1998) conducted by the Pavement/Materials Program of the University of Nevada. The project's three major tasks consisted of evaluating the rheological properties of Nevada's conventional and polymer modified binders and establishing their performance grades (PG), evaluating the contribution of binders toward low temperature cracking of hot mixed asphalt (HMA) mixtures and identifying the best method to evaluate low temperature cracking resistance to HMA mixtures, and developing a demerit system to be used with the Superpave binder-grading system.

A total of fifty-five conventional and polymer modified binders used on actual construction projects were evaluated and graded using the grading system. The Superpave-recommended PGs were determined for each project and checked against the PGs of the binders used. It was found that the majority of the binders violate the Superpave-recommended PG. On the other hand, the field performance of these projects for the past six years did not indicate any potential problems. It was concluded that the Superpave binder grading system must be modified prior to its full implementation in Nevada.

The low temperature cracking resistance of twenty-one mixtures was evaluated using the thermal stress restrained specimen test (TSRST). The fracture temperatures of the mixtures were evaluated using samples manufactured from lab-mixed lab-compacted (LMLC), field-mixed lab-compacted (FMLC), and LMLC with PAV (pressure aging vessel) aged binders (PAV-LMLC). The data showed that the fracture temperature determined by the TSRST is not consistent. In some cases, the TSRST measured fracture temperatures on the LMLC mixtures were warmer than the PAV-LMLC mixtures.

*(Nevada's Binders continued page 3)*

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Product Evaluation Committee (PEC) Meeting Recap



June 2, 1999 PEC Meeting: Left to right; Alan Hilton, Research; Gary Anderson, Specifications; Greg Novak, FHWA; Don Campbell, Traffic; Thor Dyson, District II; Gene Weight, District I; Russ Law, Operations Analysis; Dean Weitzel, Materials; Bill Mullen, Construction; Wes Clyde, Materials; (Not shown: Bill Hoffman, Structures Design; Tie He, Research.)

highly reflective, durable sign that provides increased visibility, reduced glare effects, and improved resistance to weathering, fading and graffiti. According to the HITEC (Highway Innovative Technology Evaluation Center) report, the plastic sign achieved red luminance values two to thirteen times brighter and white luminance values one to twelve times brighter than that of a typical sign with retroreflective sheeting. ☼

**Raised Pavement Markers**

To keep up with new technology and the department's need for quality pavement marking materials, the PEC approved a revision to the specification (section 633) for raised pavement markers to include the use of plastic non-reflective pavement markers. In addition to the revision, a QPL was established for permanent non-reflective, permanent reflective, and recessed reflective pavement markers. The QPL was based on extensive lab and field tests performed by the California Department of Transportation (Caltrans). ☼

**Specification Revision**

**Preformed Thermoplastic Materials**

Prompted by concerns encountered in a maintenance bid solicitation for preformed thermoplastics, the PEC approved a proposal from the Research and Maintenance Divisions to revise the thermoplastic specification (section 634) with respect to film thickness and performance requirements along with establishing a qualified products list (QPL) for this specification.

At present, two products that went through the NDOT product evaluation process are on the QPL. They are Premark 20/20 Flex from Flint Trading, Inc. and Hot Tape from Stimsonite Corp. Companies seeking placement on

the QPL are required to do the same - provide product information for evaluation via the NDOT product evaluation process. ☼

**Polycarbonate Stop Signs**

Based on a review of the polycarbonate stop sign from All Sign Products, Inc., the PEC approved a revision to current NDOT specifications, section 627, for permanent signs. The revised specification allows the use of molded thermoplastic sign panels for permanent signs with manufacturer(s) listed in the NDOT QPL.

Unlike traditional stop signs consisting of red and white retroreflective sheeting applied over a flat surface (aluminum or wood), the polycarbonate stop sign uses an injection molding process to form a



Photo 1, Polycarbonate Stop Sign installed at NDOT west exit.



**K and K Safety Assist Lights**

Based on the satisfactory performance of K & K safety assist lights in a field test, a new specification (section 625.02.07) with a QPL has been developed to allow the use of portable beacon-light systems to assist the flagger in stopping traffic at each end of a work zone. The K & K safety assist light is the first product approved under the new specification.

Two salient features of the K&K assist light make it outstanding. One is that it has a beacon on top to attract the motorist's attention, a red light for stopping traffic, and a yellow light to caution traffic. The other is that it has its own remote control so that the flagger can back up out of the line of traffic and maintain traffic flow with the remote. ☼

**Field Test Update**

**Enviro - Guard, LLC  
Quick-Guard Silt Anchor/  
Gauge**

The Quick-Guard Silt Anchor/Gauge is an erosion and sediment control enhancement device designed to clamp to the bottom edge of geotextile fabric used in silt-fencing. According to the vendor, use of this product can provide the following benefits: 1) they force proper installation of a silt fence in a containment trench; 2) the anchors increase resistive forces of a containment trench that reduce the potential of blow-outs as water and sediment collect behind a silt fence; 3) increased efficiency of silt fences reduces sediment from runoff waters; and 4) inspection of silt fence installation and maintenance becomes easier.

Based on the information presented, and a recommendation from the Hydraulics Division, the PEC approved a field test of the Quick-Guard Silt Anchor / Gauge from

several states ☼

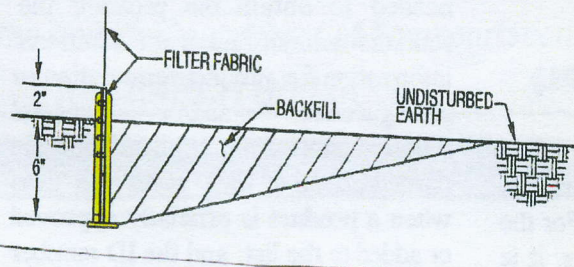
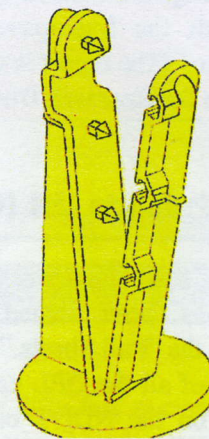


Figure 1, Illustration of the Quick-Guard Silt Anchor/Gauge (A) Installation



(B) device depiction

Enviro-Guard, LLC. ☼

**3 M**

**Stamark Liquid Pavement  
Marking Series 1200**

In keeping with the department's effort to promote new technologies, the PEC approved 3M's request for a field test of Stamark Liquid Pavement Marking Series 1200 in a longitudinal application of about 50,000 linear feet.

The liquid pavement marking system features high initial reflectivity achieved by a combination of reflective elements and glass beads, both dropped onto the binder just after it is coated and before it hardens. The system can provide a minimum initial reflectance of 1000 millicandelas for white and 600 millicandelas for yellow, which is about 2-3 times brighter than other systems such as epoxy.

The system is still in the process of development. Hence, the goal of the test may not be immediate approval of this product, but to further the development of this new marking system through a series of field trials in

**KOCH  
High Float Emulsion**

In the last issue of our newsletter, we reported that the field test of KOCH high float emulsion (HFE-60P) had been moved to District I from the originally approved test site in District III. However, the field test has been canceled due to a change in the status of the project that was considered for the test and a lack of response from the vendor. ☼

*(Nevada's Binders continued from page 1)*

It was concluded that the critical low temperature determined by the Superpave binder system is conservative for the majority of cases which makes it an acceptable alternative to mixture testing until a more consistent mixture evaluation system is developed.

Also, using the performance parameters of asphalt binders as identified by the Superpave system along with the relationships between these parameters and the performance of HMA mixtures established in the Strategic Highway



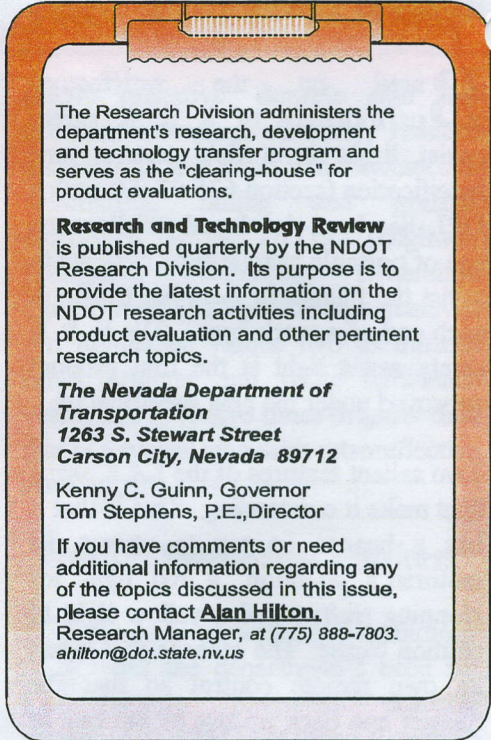
Research Program (SHRP), this research developed a demerit system to be used with the Superpave binder grading system. (The report is available for loan from the Research Division) ☺

**Qualified Products List (QPL)**

The first edition of department's QPL has been issued as an attachment in the "Pull Sheets." For the convenience of all the QPL users, it is also placed on the NDOT computer network (network neighborhood/datsrv1/QPL).

The new QPL is tabulated with seven columns: the specification number, product type, manufacturer's name and address, product name, remarks, carded/effective date and ID number.

The specification number and product type define the product's approved application(s) and purpose(s); the manufacturer's name and address and product name provide the information needed to obtain the product; the remarks column marks the additional information for product formulation or configuration and/or special requirements for application; the carded/effective date gives the time when a product is officially approved or added to the list; and the ID number helps to identify the products, particularly those that have multiple applications. The whole table is arranged in the order of specification number and product type. Also, there is a quick indexing feature that references products to a page number in the table. ☺



The Research Division administers the department's research, development and technology transfer program and serves as the "clearing-house" for product evaluations.

**Research and Technology Review** is published quarterly by the NDOT Research Division. Its purpose is to provide the latest information on the NDOT research activities including product evaluation and other pertinent research topics.

**The Nevada Department of Transportation**  
1263 S. Stewart Street  
Carson City, Nevada 89712

Kenny C. Guinn, Governor  
Tom Stephens, P.E., Director

If you have comments or need additional information regarding any of the topics discussed in this issue, please contact **Alan Hilton**, Research Manager, at (775) 888-7803. [ahilton@dot.state.nv.us](mailto:ahilton@dot.state.nv.us)



**Nevada Department of Transportation**  
1263 S. Stewart St.  
Carson City, Nevada 89712

